

CLAIMS:

1. (Currently Amended) A lithium-metal-oxide ~~electrode material compositions and structures~~ having a single-phase layered crystallographic structure and the general formula ~~$\text{Li}_x\text{Mn}_y\text{M}_z\text{O}_2$ where $0 \leq x \leq 0.20$, $\text{Li}_x\text{Mn}_y\text{M}_z\text{O}_2$ where $0 < x \leq 0.24$, $0 < y < 1$, $z = 0.46$ to 0.86 , and $y + z = 0.94$ to 0.99~~ , manganese is in the 4+ oxidation state and M is one or more transition metal or other cations, but is not solely Ni or Cr.
2. (Currently Amended) A material according to claim 1, wherein M is chosen from all of the other first row transition metals: Ti, V, Cr, Fe, Co, Ni and Cu, and other cations with appropriate sized ionic radii: Al, Mg, Mo, W, Ta, Si, Sn, Zr, Be, Ca, Ga, and P, ~~but is not solely Ni~~.
3. (Currently Amended) A material according to claim 1, wherein M is one or more transition metal or other cations chosen from the other first row transition metals: Ti, V, Cr, Fe, Co, Ni and Cu, and other metal cations ~~such as~~ selected from Al, ~~Mg~~, Mo, W, Ta, Ga and Zr.
4. (Original) A material according to claim 1, wherein M is one or more transition metal or other metal cations chosen from the first row transition metals and Al.
5. (Previously Amended) The use of a material according to claim 1, as positive electrode in a non-aqueous lithium cell or battery, such as a lithium ion cell.
6. (Currently Amended) A process for making a material of formula ~~$\text{Li}_x\text{Mn}_y\text{M}_{1-y}\text{O}_2$, $\text{Li}_x\text{Mn}_y\text{M}_z\text{O}_2$~~ wherein ~~$x \leq 0.2$, $0 < x \leq 0.24$, $0 < y < 2$~~ , $z = 0.46$ to 0.86 , and $y + z = 0.94$ to 0.99 , Mn is Mn+4 and M is one or more transition metal cations or other cations, but is not solely Ni or Cr comprising providing a starting material of formula ~~$\text{Li}_{1+x}\text{Mn}_y\text{M}_{1-y}\text{O}_2$, wherein x is equal to or greater than 0~~, $\text{Li}_x\text{Mn}_y\text{M}_z\text{O}_2$, M is one or more transition metal or other cations, as a cathode in a lithium ion cell, and charging the cell to a high voltage in the

voltage in the range of 4.4 to 5 volts versus the potential of metallic lithium in the temperature range of room temperature to 55°C .

7. (Original) A process according to claim 6, wherein M is chosen from all of the other first row transition metals: Ti, V, Cr, Fe, Co, Ni and Cu, and other cations with appropriate sized ionic radii: Al, Mg, Mo, W, Ta, Si, Sn, Zr, Be, Ca, Ga, and P, but is not solely Ni.

8. (Currently Amended) A process according to claim 6, wherein M is one or more transition metal or other metal cations chosen from the other first row transition metals: Ti, V, Cr, Fe, Co, Ni and Cu, and other cations ~~such as~~ selected from Al, Mg, Mo, W, Ta, Ga and Zr.

9. (Original) A process according to claim 6, wherein M is one or more transition metal or other metal cations chosen from the first row transition metals and Al.

10. (Cancelled)

11. (New) A process according to claim 6, wherein the temperature is room temperature.

12. (New) A process according to claim 6, wherein the starting material is $\text{Li}_{1.2} \text{Mn}_{0.4} \text{M}_{0.4} \text{O}_2$ wherein M is $\text{Ni}_{0.4-x} \text{Co}_x$ wherein $x = 0.1$ to 0.4 .

13. (New) A process according to claim 12, wherein M is $\text{Ni}_{0.2} \text{Co}_{0.18} \text{Cu}_{0.4}$ or $\text{Ni}_{0.2} \text{Co}_{0.1} \text{Al}_{0.1}$.

14. (New) A material according to claim 1, wherein M is Ni, Co or Ti, Ni, Co or Ni, Co, Cu or Ni, Co, Mg or Ni, Co, Al.

15. (New) A material according to claim 14, wherein $x=0.05$ to 0.20 .

16. (New) A material according to claim 1, wherein $x=0.06$ to 0.24 and $y=0.12$ to 0.49 .

17. (New) A process according to claim 6, wherein $y'=0.118$ to 0.4 .